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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/836,369	04/18/2001	Yuichi Hashimoto	35.G2780	6891

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EXAMINER	
CLEVELAND, MICHAEL B	
ART UNIT	**PAPER NUMBER**
1762	

DATE MAILED: 10/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/836,369	HASHIMOTO ET AL.
	Examiner	Art Unit
	Michael Cleveland	1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5,9-11 and 13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5,9-11 and 13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3, 5, 9, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (U.S. Patent 6,420,834, hereafter '834) in view of Matsuura et al. (U.S. Patent 6,001,413, hereafter '413).

Claim 1: '834, Embodiment 2 (Figure 3), teaches a method of making an organic (electro)luminescent (EL) device comprising the steps of:

forming a first electrode (104, 311) on a substrate (col. 3, line 60-col. 4, line 16; col. 6, lines 18-20),

evaporating an organic layer on the first electrode (col. 4, lines 14-30; col. 6, lines 7-46); and

forming a second electrode on the organic layer (col. 4, lines 31-48),

wherein the organic layer is formed by applying a voltage to the first electrode (col. 6, lines 25-38) without generating a plasma (No plasma is used in Embodiment 2; compare and contrast to Embodiment 4 in col. 8). (The voltages referred to must be consistently positive and negative to achieve the repulsion characteristics described at col. 5, lines 9-32. Therefore, they must be DC voltages.)

The first electrode is driven by a positive voltage (col. 6, lines 32-38). A positive voltage drives an electrode as an anode (col. 5, lines 2-14).

'834 does not explicitly teach that the deposited EL layer is a hole-transporting layer, but does teach that EL layer (851), which may be deposited by the method of Fig. 3 (i.e., embodiment 2) (col. 17, lines 55-56) may be include a hole-transporting layer (col. 18, lines 1-5). Therefore, the fair teaching of '834 is that the hole-transporting layer may be deposited by the method of Fig. 3. However, the examiner takes Official Notice that it is well known in the art of

organic EL devices for organic hole-transporting compounds to be organic compounds deposited by vapor deposition. See, for example, 413, col. 6, lines 6-10. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have deposited an organic hole-transporting layer by the method of Embodiment 2 with a reasonable expectation of success because '834 teaches that the EL layer may comprise a hole-transporting layer and that such layers may be deposited by the vapor deposition method of Embodiment 2 and because '413 confirms that it is known in the art to deposit such organic hole-transporting layers by vapor deposition.

Claim 3: The organic layer is formed by resistance heating evaporation ('834, col. 5, line 67-col. 6, line 2; '413, col. 6, lines 50-68).

Claim 5: The anode may be indium tin oxide (col. 3, lines 63-65, col. 11, lines 59-61; col. 17, lines 33-35).

Claim 9: Yamazaki '834 describes formation of an EL device by deposition of an organic layer on an electrode while driving it as an anode, as described in the discussion of claim 1, above. It does not teach an oxygen or inert gas plasma surface treatment of the electrode before depositing the organic layer.

Matsuura '413 teach that in forming EL devices, it is desirable to clean the ITO anode with an oxygen and inert gas (such as argon) plasma (col. 6, lines 4-37) in order to prevent contamination (col. 11, lines 39-61). The subsequent organic EL layer(s) are deposited on the cleaned substrate without breaking vacuum also to prevent contamination (col. 6, lines 43-61; Abstract; col. 2, lines 18-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have plasma cleaned the ITO anode of Yamazaki '834 and then deposited its organic layer without breaking vacuum because Matsuura '413 teaches that plasma cleaning and then deposition without breaking vacuum would have reduced the effect of contaminants on the resulting EL device.

Claims 1 and 13: '834 is silent as to the voltage to be applied to the electrode during deposition. However, col. 5, lines 9-32 describe that the operation of the invention occurs because the banks (105b) on the substrate where deposition is not desired are given the same charge as the EL material being deposited, and therefore the banks repel the EL material. Likewise, the chamber walls and the substrate holder may be given the same charge also to repel

the material (col. 6, lines 11-32). It is therefore apparent that the EL material is therefore attracted to the oppositely-charged electrodes because opposite charges attract and like charges repel. The degree of attraction or repulsion is controlled by the magnitude of the voltages. Larger voltages would have provided greater degrees of attraction or repulsion, but would have required more energy. Therefore, the positive and negative voltage are result-effective variables because they affect the degrees of attraction and repulsion and the energy cost during deposition. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the voltages for the best balance of attraction to the electrodes, repulsion from the non-deposition surfaces and cost, particularly in view of the teachings of '834 that the determination of the voltages may be determined by the implementers (col. 5, lines 9-19).

3. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki '834 in view of Matsuura '413, as applied to claim 9, above, and further in view of Leiphart (U.S. Patent 6,187,151, hereafter '151). (Ameen et al. (U.S. Patent 5,834,371, hereafter '371) is further cited as evidence in the discussion of claim 11.)

Yamazaki '834 and Matsuura '413 teach the construction of an EL device by cleaning an ITO electrode in an oxygen/argon plasma, as discussed above. They are silent as to the energies of the ions in the plasma, and therefore do not teach 10-80 eV for oxygen nor 20-100 eV for argon.

'151 teaches that during plasma cleaning, the energy level of the ions should be controlled in order to prevent damage to the substrate (col. 3, lines 56-64), and particularly suggests that ion energies of about 0-50 eV may be used when performing plasma cleaning with oxygen or argon (col. 3, lines 24-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used oxygen and/or argon ion energies of 0-50 eV as the particular ion energies in the invention of '834 and '413 in order to have prevented the cleaning ions from having damaged the substrate. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a *prima facie* case of obviousness, see *In re Malagari*, 182 U.S.P.Q. 549.

Claim 11: A plasma works by stripping atoms of their electrons. Thus, an argon plasma inherently creates positive argon ions. See '371, col. 2, lines 4-29.

Response to Arguments

4. Applicant's arguments filed 6/25/04 have been fully considered but they are not persuasive.

Applicant's argues that unexpected results between 10 V and 0V are shown by the Examples. The argument is unconvincing because the closest prior art teaches the use of a voltage.

Applicants argues that the claims limit the organic layer deposition to applying voltage to the anode. The argument is unconvincing because the organic layer deposition contains two substeps: that of applying the voltage to the anode and that of forming the layer from the evaporated material. However, the claims do not exclude that the step of forming the layer from the evaporated material itself includes further sub-steps, such as evaporating the material and charging the evaporated material.

Applicant argues that Yamazaki teaches at col. 18, lines 60-65 teaches away from the range 10-100 V because it teaches the use of 5V or less. The argument is unconvincing because the cited passage explicitly teaches "10 V or less".

Applicant argues that the Examiner's statement that is would have been obvious to have optimized the voltages is a "bald unsupported conclusion." The argument is incorrect because the Examiner's conclusion is based upon the scientific principles that are well understood within the art and was supported by the following explanation quoted from the prior Office Action,

> "'834 is silent as to the voltage to be applied to the electrode during deposition. However, col. 5, lines 9-32 describe that the operation of the invention occurs because the banks (105b) on the substrate where deposition is not desired are given the same charge as the EL material being deposited, and therefore the banks repel the EL material. Likewise, the chamber walls and the substrate holder may be given the same charge also to repel the material (col. 6, lines 11-32). It is therefore apparent that the EL material is therefore attracted to the oppositely-charged electrodes because opposite charges attract and like charges repel. The degree of attraction or repulsion is controlled by the magnitude of the voltages. Larger voltages would have provided greater degrees of attraction or repulsion, but would have required more energy. Therefore, the positive and negative voltage are result-effective variables because they affect the degrees of attraction and repulsion and the energy cost during deposition. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the voltages for the best balance of attraction to the electrodes, repulsion from the non-deposition surfaces and cost, particularly in view of the teachings of '834 that the

> determination of the voltages may be determined by the implementers (col. 5, lines 9-19)."

It is well settled that the discovery of the optimum value of a result effective variable in a known process is ordinarily within the skill in the art. *In re Boesch and Slaney*, 205 USPQ 215 (CCPA 1980). Therefore, in order to convincingly traverse this ground of rejection, Applicant MUST 1) explicitly state that it would NOT have been obvious to have optimized the voltages of Yamazaki, and 2) explain why the Examiner's determination that the voltage of Yamazaki is result effective is incorrect, citing specific scientific reasons or evidence to contradict the Examiner's analysis.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (571) 272-1418. The examiner can normally be reached on Monday-Thursday, 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael Cleveland
Examiner
Art Unit 1762

9/30/2004